ELECTIVE (SSC5a) REPORT (1200 words)

A report that addresses the above four objectives should be written below. Your Elective supervisor will assess this.

Objective 1

The prevalence of ophthalmological conditions in Gujarat follows similar patterns to those in India as a whole. This is a significant burden with 1 in 4 Indians above the age of 50 were visually impaired.[1] The eye conditions that lead to this high rate are more often than not chronic conditions that are generally are a result of underlying disease. I will attempt to give an overview of the conditions I saw most frequently during my elective.

Diabetic retinopathy, a vascular disease of the retina that results in either proliferative or non-proliferative retinopathy and/or macular oedema has a prevalence rate of 16.9% in the diabetic population of India (with diabetes itself having a rate of roughly 11% in the Indian population.[2][3]

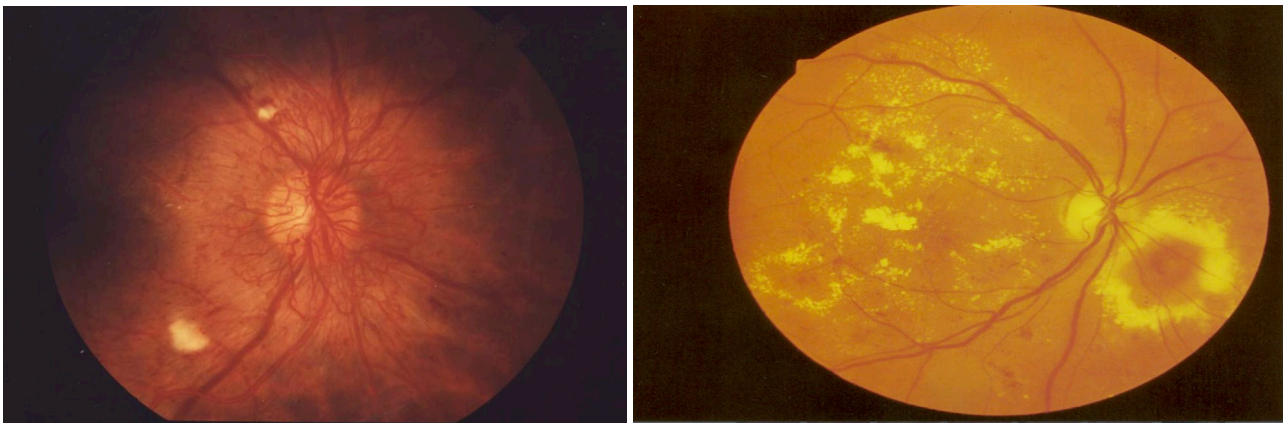

Figure1: Side by side comparison of the differences of proliferative (left) vs non-proliferative (right) diabetic retinopathy. Note the neovascularization in the optic disc on the left image, cotton wool spots (areas of retinal ischemia). This is contrasted by the non-proliferative image on the right where we see the hard exudates (and a lack of neovascularization) which are pathognomonic for the condition.[2]

The second condition that occurred with a high frequency were cataracts. The town I was working in Anand would be classed as an urban center, with a population of roughly two million. A 2019 study found that lower social economic status and increased age were statistically significant risk factors for cataracts in both rural and urban areas. This agrees with data from a 2004 study which found that south Indian rural populations had a prevalence rate of 47.5% of cataracts – with these rural areas noted for being poorer than the urban centers.[4][5]

Further reasons for this high prevalence rate of cataracts in both urban and rural populations can be attributed to the climate of India which results in excessive sunlight or UVB exposure combines with high rates of diabetes mellitus.

Cataracts can be subdivided by their stages of progression:

1. Immature cataract: early stage with red reflex is still present and retina can be visualized.
2. Mature cataract: advanced stage, red reflex is absent and there can be white/yellow discoloration of lens due to clouding, this can result in vision loss.
3. Hypermature cataract: complete white clouding of the lens with the nucleus of the cataract appearing brown.[6]

I saw mainly acquired cataracts, which comprise >99% of all cataracts, however congenital cataracts (<1%) do exist and can be caused by a variety of conditions (TORCH infections, Galactosemia, Trisomies, NF2, Marfan syndrome amongst others).

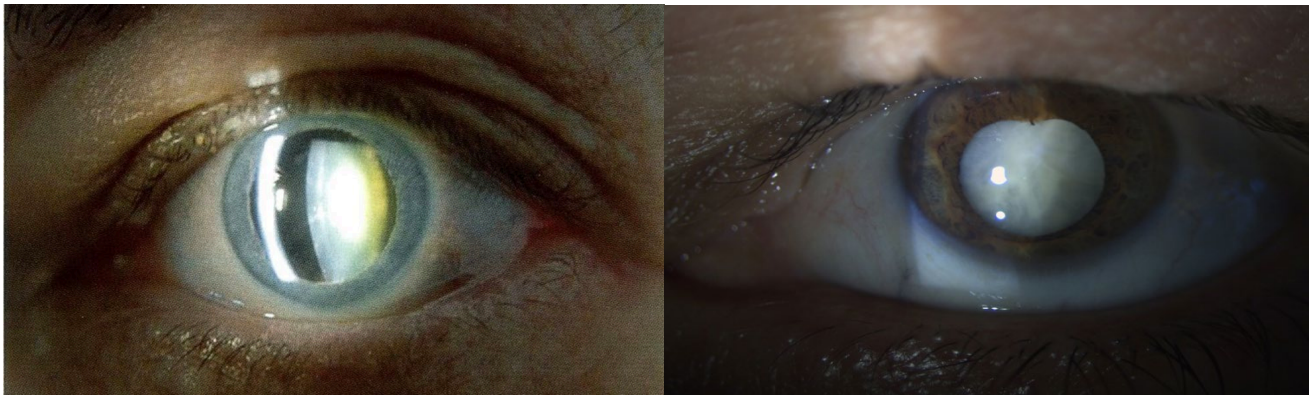

Figure 2: First image shows typical appearance of a cataract under slit lamp examination, note that the pupil is dilated and the yellow tinge of the lens. The second image shows a mature cataract where the white opacification covers the entire lens.[7]

The UK is estimated to have a cataract prevalence rate of 30% in the over 65-year-old population. With a further 10% of over 65s having had cataract surgery.[8] This is slightly below the global average of 33%. With regards to India a 2019 study found that in the >60-year-old population, cataracts had a higher prevalence rate (44% in rural and 43% in urban populations). This suggests that in India cataracts are more prevalent compared to the global population average. [9]

Further conditions such as glaucoma (with around 11 million cases in >40 years old in India), dry eye syndrome, blepharitis and amblyopia were also seen in the clinic and occur with varying frequencies. I will discuss amblyopia in detail in my second report that focuses on the latter two weeks I spent in India for my SSC remediation.

<u>Objective 2</u>

Health care in India is divided into a public and private system. Within the public system it is further divided into secondary and tertiary hospitals that are generally centralized in larger cities and primary centers offering basic services to rural areas.[10] In contrast to the UK the Indian public health system is not as well funded, this manifests in cheaper care and on the whole worse outcomes for patients. However, this leaves the door open for a thriving private healthcare industry in India. From discussions with doctors on this elective ophthalmology with its specialized machinery and the need for highly trained doctors lends itself well to private practice as the public health system is not often able to deliver these services.

Objective 3

One of the most ambitious public health initiatives with regards to ophthalmology in India was the Vision 2020 global initiative which aimed to eliminate preventable global blindness by 2020. In India this manifested as the National Program for Control of Blindness and Visual Impairment.[11] This program was able to reduce blindness and visual impairment by 47% and 52% respectively. This has led to an estimated absolute 28 million reduction in visually impaired persons since 2010. Although this is a significant reduction in ocular conditions the need for further reductions is needed in India. Untreated cataracts are noted to be a significant percentage of the preventable blindness cases India faces and there are drives on the way to reduce their impact.[11]

Objective 4

My personal objectives for this elective were met through attending clinics and surgeries at one of the private eye hospitals in India. Through these sessions I was able to gain further insight into a variety of procedures and how an ophthalmological consultation is carried out. One of the most common procedures I saw was phacoemulsification which is a form of cataract removal surgery. I will discuss how the surgery is carried out.

Phacoemulsification

1. Phacoemulsification begins with local anaesthesia where a needle containing anaesthetic is inserted around the eye socket generally in two to three locations.
2. The next stage is a corneal incision of 2-3mm into the cornea. This is a minimal incision that generally self-heals due to its tiny size. Two incisions are generally made so that two probes can be inserted.
3. Viscoelastic material is injected into the anterior chamber to maintain the eyes volume, intra-ocular pressure is maintained through irrigation.
4. A small instrument is then inserted through the incision and a circular opening (capsulorhexis) is made in the capsule (membrane in front of the lens).
5. Phacoemulsification is carried out using a ultrasound probe which vibrates with a frequency in the range of 27-60kHz. Once emulsified a blunt probe can be used to divide the lens matter further, this debris is then aspirated.
6. Further aspiration can be used to remove remaining smaller cortical material.
7. A foldable intra ocular lens is then inserted through the corneal incision generally using an autoinjector system that injects a folded lens within a capsular bag that then unfolds. The lens properties such as mono or muti-focal depends on patient preference.
8. The vivoelastic material is aspirated out and the patient is given postoperative care, the incisions are generally small enough to self heal.[12]

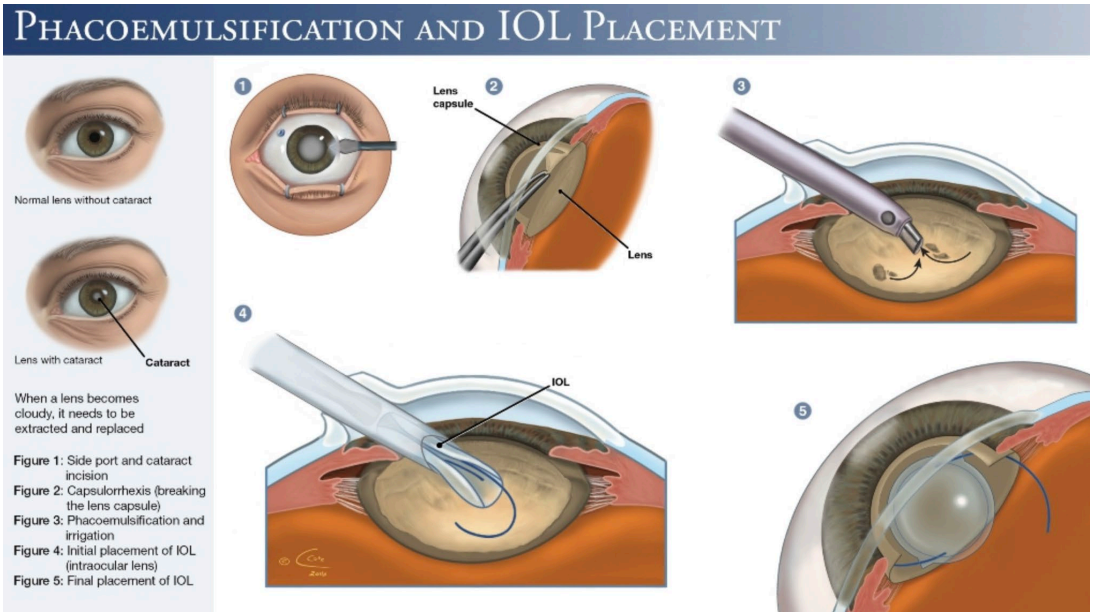

Figure 3: Outline of phacoemulsification. With the major steps of the surgery as above noted.[13]

For insights into the differences between adult and pediatric ophthalmology, please see my second report for my SSC remediation. I did not manage to find an interesting case to write up, so in this way I wasn't able to finish all of my personal objectives. Even with this is mind I believe that I still learnt a lot both about ophthalmology and the Indian healthcare system.

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